

Design principles for heutagogical learning: Implementing student-determined learning with mobile and social media tools

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Mobile and social media over the last decade has created significant shifts in society: how we communicate and collaborate, and in learning and teaching. This paper discusses a study that investigated how mobile social media tools and affordances could be harnessed to facilitate a student-determined learning experience (heutagogy). A design-based research (DBR) approach was utilised to analyse and investigate a set of draft design principles that was established in collaboration with a group of teachers and literature. The draft design principles guided the design of a first year course that was iteratively implemented and evaluated over 2 years with two different cohorts of students. As a key outcome of the DBR, a set of refined design principles is presented. These principles are capable of guiding other practitioners in designing and facilitating student-determined learning in authentic contexts using mobile devices, and social media affordances.

Introduction

Heutagogy (Hase & Kenyon, 2000), also referred to as self-driven and self-determined learning, has gained momentum as a learning and teaching framework over the last decade (Blaschke, 2012). Heutagogy could be seen as a progression of pedagogy and andragogy, where the learner has the autonomy to determine and direct his/her own learning path and process (Hase & Kenyon, 2000). To outline this progression and how it informs student learning, Luckin et al. (2011) proposes the pedagogy-andragogy-heutagogy (PAH) continuum. On the PAH continuum, which also acts as a framework for scaffolding the learner for heutagogic learning, pedagogy is viewed as an approach for building the learner's understanding of the discipline, while andragogy is viewed as an appropriate approach for helping the learner build an understanding of how to negotiate their way through the learning process: developing metacognitive skills. Heutagogy is seen as a platform for "developing the understanding that you are empowered to look at the learning context afresh and take decisions in that context" (Luckin et al., 2011, p. 78), enabling the learner to apply the metacognitive skills in different contexts that help them gain epistemic traits.

While heutagogy was theorised in 2000, it remained largely unacknowledged and underutilised until the rise of social media tools over the last 15 years (Blaschke, 2012). Increased learner autonomy over the learning path and process implies that learning could eventuate at any time and any place, and is nonlinear in nature. Blaschke (2013, p. 57) continues "when using Web 2.0, the learner's ability to be self-determined is inherent in the system: the web is nonlinear, allowing the learner to decide in a random way what and how she or he will learn", implying the principles of Pedagogy 2.0 (McLoughlin & Lee, 2008). Pedagogy 2.0 is a framework for effectively exploiting the affordances (action possibilities, refer Gibson, 1977) of social media tools to enable learner participation, personalisation, and productivity, the 3Ps (Table 2).

While social media tools allow the learner ability to self-determine what and how to learn, a critical component missing in heutagogic learning for building learner capability is where the learning takes place. This implies learner mobility across contexts as an important element in the process. Since the introduction of mobile phones, mobile technology and affordances have advanced at a rapid rate that allows users to "access internet resources and run experiments in the field, capture, store and manage everyday events as images and sounds and communicate and share the material with colleagues and experts around the world" (Sharples, 2002, p. 222). As a result, mobile devices combine the affordances of social media tools and allow the user to create, communicate, and share content as part of everyday life without temporal limitations across physical and virtual realm. This amplifies the learner's ability to determine and direct their learning by choosing or creating an appropriate context for their learning.

This paper describes a research study that used a design-based research approach (DBR) to design and evaluate a learning solution that embedded the use of mobile and social media tools in a course underpinned by heutagogic learning principles. In a DBR approach there are two key outcomes: *contribution to theory* and *transferrable knowledge*. This paper presents the transferrable knowledge from the DBR study in terms of the refined design principles, capable of providing educators with pedagogical guidance for embedding effective heutagogic learning using mobile and social media tools in a course.

Methodology

While there are several conceptual models of DBR approaches, Reeves' (2006) 4-phase of DBR model (Figure 1) was chosen due to its appropriateness and specific inclusion of educational technology and its affordances. A core tenet of DBR is a close collaborative partnership between the researcher and practitioner. This grounds the research and provides naturalistic context, ensuring the research has direct impact on practice, which in turn helps refine or elicit transferable knowledge (design principles) and contributes to theory. A first year journalism course was chosen as an appropriate context to implement the study, as journalism and journalistic practice have a high degree of synergy with self-determined and self-driven learning, with an increasing focus on the use of mobile and social media tools to create, report, and engage with audience.

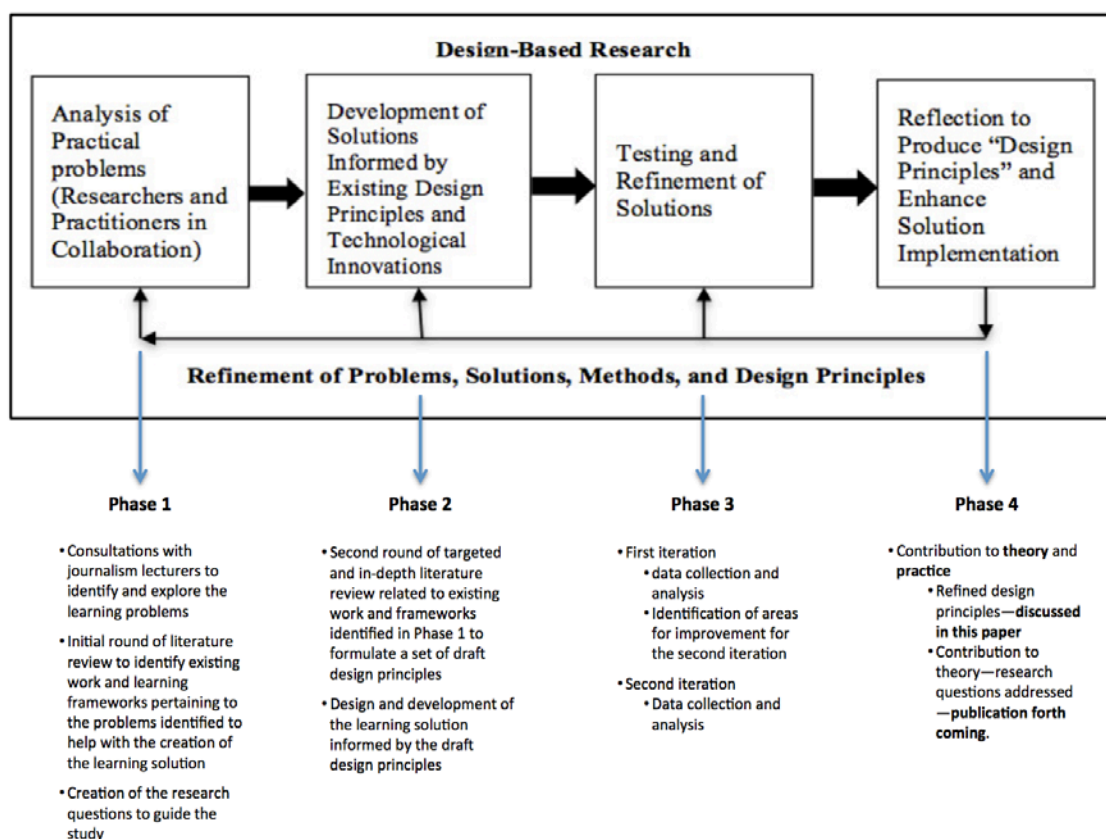


Figure 1. The 4-phase DBR approach (Reeves, 2006, p. 59)

Data were collected with ethical approval over two 12-week iterations, over 2 years. An overview of the data collection methods and participating numbers for each is provided in Table 1.

Table 1
Data collection and numbers per iteration

Method	Iteration 1 <i>n</i> = 174	Iteration 2 <i>n</i> = 162
Student volunteering numbers for:		
Artefacts - ePortfolio	28	29
Anonymous survey	44	40
End of the semester focus groups (three per iteration)	6, 6, 6	7, 10, 5
Interviews	8	8
Practitioner created artefacts. Number of practitioners per iteration:	3	4

Note: Researcher reflections were captured related to learning and teaching, and the use of mobile and social media tools by the students and all practitioners involved in both iterations.

Miles and Huberman's (1994) process of data reduction, data display, and conclusion drawing and verification was used as the governing approach for data analysis in both iterations. Interview and focus group transcripts, open-ended questions from the survey, researcher reflections, and other documentary evidence were analysed using the first 2 phases of Miles and Huberman's process. Iterative rounds of data reduction and display began with analysing and coding the data based on the priori themes for each draft design principle using NVivo. The units of data coded to each theme were then compared for similarities and differences using a constant comparative method (Glaser, 1965). The 4 phases of the DBR model, and how they informed and guided the design of the study are discussed in the sections below.

Analysis of the problem: Consultations with the practitioners

In phase 1 of the study, consultations with journalism lecturers were held over a semester to identify, understand, and evaluate the problem areas they faced in teaching a first year journalism course. A key issue for the practitioners in teaching journalism was the lack of authentic learning experiences for the students. Accompanying this was the lack of focus on the use of social media tools and mobile devices in the course, which are important competencies for journalists in the modern era (Alejandro, 2010). Another critical aspect the practitioners wanted to facilitate in the course was independent and self-driven learning that contextually embodied learning and journalistic practice, and provided a contemporary learning experience. Following this, a literature review was carried out to identify, explore, and understand possible solutions or frameworks (e.g., Narayan & Herrington, 2014) that could guide the creation of a solution in practice (Reeves, 2006) for the problems identified by the practitioners.

Formulation of the design principles and development of the learning solution

In phase 2 of the study, another targeted and in-depth literature review was conducted focusing on frameworks and existing guidelines identified in phase 1 to formulate a set of draft design principles. Literature pertaining to the use and conceptual underpinnings of heutagogy (Hase & Kenyon, 2000), Pedagogy 2.0 (McLoughlin & Lee, 2008), and mobile learning (Sharples, 2002), were reviewed, and draft design principles were formulated to guide the design of the learning solution for the practitioners. The draft design principles were incorporated in the redesign of a journalism course (12-week semester) and a learner-centred learning environment (solution in practice) was created (Figure 2). A detailed description of each draft design principle and how they were instantiated in the design of the learning solution is provided in Table 2.

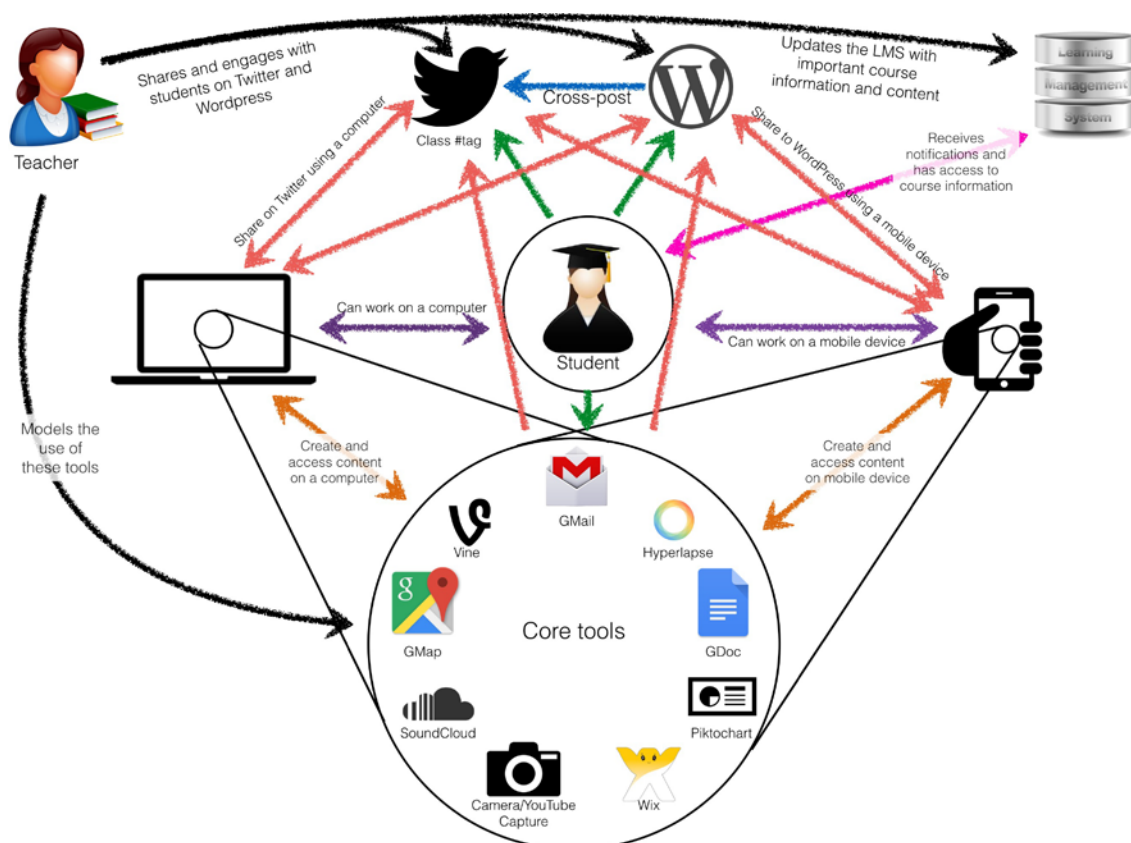


Figure 2. The learning intervention for the journalism practitioners

The overall design of the Principles of Journalism course (PoJ) was underpinned by three key assessment events: (1) a reflective diary in the form of a blog (eportfolio); (2) an investigative written report; and (3) the production of a web-based multimedia story.

Table 2

Instantiation of the draft principles in PoJ

Draft design principles (DPs)	Meaning	How the principle was implemented in the course	References
DP1: Design learning activities, tasks and a learning environment that encourages elements of learner participation, personalisation and productivity underpinned by the affordances of mobile and social media tools.	The affordances of mobile and social media tools are explored and exploited to pedagogically design learning activities, tasks and a learning environment for learner productivity, personalisation and participation.	Creating the learning environment: The students created a personal blog using WordPress and a Twitter account. As part of the learning process, the students were required to create and include multimedia content in their reflective blog posts and the final news story using tools such as YouTube Capture, PiKtochart, Hyperlapse, SoundCloud, Google Maps and Vine (applications enclosed in the circle in Figure 2).	Bachmair & Pachler, 2014; Beetham & Sharpe, 2013; Cochrane, 2012; Luckin, 2010; McLoughlin & Lee, 2008, 2010
	Productivity: Learners as creators of knowledge or content through social processes.	Productivity: Students used their mobile devices and a set of social media applications to capture contextual data and information to advance their learning and write a news story.	

	Personalisation: Learners have access to a wide range of resources and ideas such as online communities, subject experts, and content to seek and guide learning according to their needs.	Personalisation: The main assessment task allowed the students to self-select the news story they were interested in investigating. Based on their choice for the type of news story, the students had to determine and drive the learning and the assessment process to collect valid data and information to write a newsworthy and trustworthy multimedia story.	
	Participation: Learners are able to seek scaffolds for learning through collaboration with peers and teachers in a learner community and through linkages, connections and interactions across communities by sharing ideas, inquiry and problem solving.	Participation: Students interacted with peers in class and audience through their blog and Twitter (using/creating hashtags). The design of the assessment tasks encouraged the students to collaborate with the public and other entities and online resources to investigate and compose a newsworthy story.	
DP2: Facilitate learning using tools that are open, platform independent and learner owned devices.	The facilitation of learning should consider tools that are open and accessible on learner-owned devices.	The selection of tools for use in PoJ had to meet the pre-requisites of being able to deliver a seamless user experience over different learner-owned mobile devices and desktop platforms, and enabled sharing of data and information publicly and in private.	Cook, 2010; Kukulska-Hulme & Traxler, 2013
DP3: Situate learning in authentic contexts decided by the learner to enable exploration and experimentation.	The design of learning activities considers the uniqueness and affordances of mobile learning and heutagogy—enabling learner mobility and participation in contexts and the ability to create contexts for learning (learner-generated context).	The students needed to investigate and compose a news story based on a person, an event, or an issue based in the real world as an assessment task. To compose the news story, the students were encouraged to explore and experiment with different mobile and social media tools and affordances to create multimedia content for the story.	Herrington, Herrington, & Mantei, 2009; Luckin et al., 2011; McLoughlin & Lee, 2008
DP4. Design formative assessment events that encourage learner participation and reflection in the process.	The assessment in the design of the course is viewed as ‘assessment for learning’ where the entire learning journey of a student is viewed as an assessment event and formative feedback and inquiry from the teachers play an important role in enabling reflection and building learner autonomy skills.	Providing the learner with choice to select the news story they wanted to investigate and write made them the central agent in the learning process and provided them the ability to determine their own learning path, encouraging learner participation in customising the assessment tasks. The students were asked to publish and share reflective blog posts in the course, which was supported by formative feedback by the teachers in class and through student blog and Twitter.	Blaschke & Hase, 2016; Cochrane, 2012

DP5: Provide a clear explanation, expectation and the rationale for the use of the tools.	A clear, rational explanation of the use of the tools and devices is given to the learner.	A clear and concise explanation of the course set-up and expected use of the tools was given to the students in the first week of the lecture and iterated in the tutorial sessions. Also outlined in the course handbook.	Blaschke, 2013; Cochrane, 2012
DP6: Provide technological support and model pedagogical use of the tools.	Technological support and the use of mobile and social media tools are modelled to the learners on an on-going basis.	Students were supported in the first week of the course in setting up and familiarising themselves with the features of the core platforms (WordPress and Twitter) and technological support was provided on weekly basis. The lecturers modelled the use of the tools (black arrows in Figure 2) in class and online.	Cochrane, 2012; Cook, 2010; Herrington, Reeves, & Oliver, 2010

Iterative implementation and refinement of the learning solution

A key characteristic of DBR is the iterative testing of the effectiveness of the design in practice. In phase 3 of the study the learning environment (developed in phase 2) was implemented with two different cohort of students at a University in Auckland, New Zealand, over 2 years. Data collected in the first iteration were analysed to identify areas for improvement for the second iteration.

Results

Areas for improvement after the first iteration

After the first iteration, data from the survey and the focus groups were analysed to identify issues that needed improving in the second iteration. Two key areas to help the students were identified:

1. Learn and understand the use of mobile and social media tools for academic purposes
2. Conceptualise their role in the course for heutagogic learning.

The two issues combined created complications in the first iteration, as the students expected the teacher to manage their learning for them. In contrast to this, students in heutagogic learning create knowledge and understanding through active participation and by taking ownership of the learning process and path. In order to help the learners understand and conceptualise their role in heutagogic learning, they need to be inducted and scaffolded into acquiring self-driven and determined learning skills and knowledge (Canning, 2012). To achieve this, Luckin (2008), building on Vygotsky's notion of zone of proximal development (ZPD) (Vygotsky, 1978), proposes the learner centric ecology of resources (EoR) model. An EoR could be assembled by the teacher, an expert or former students and includes resources such as buildings, books and knowledge, people, technologies, and artefacts (Luckin, 2010). The EoR acts as a platform that helps the learner gain an understanding of his/her role in the learning process by seeking scaffold and collaborating with the knowledgeable others, building heutagogic skills to exploit the affordances of the learning technologies (Luckin, 2008; 2010).

As a result, a key focus in the redesign for the second iteration was placed on creating an EoR (Figure 3) to compliment the initial setup (Figure 2). An EoR (course website) was created for coordinating (blue arrows in Figure 3), scaffolding, supporting and modelling the learning and the use of technology (black arrow) that could be accessed by the students on their devices (blue and purple arrows). In collaboration with the practitioners an EoR was developed consisting of:

- a course blog (self-hosted WordPress),
- a Twitter community using a class hashtag,
- instructional videos on how to use the mobile and social media tools,
- exemplar artefacts of the use of mobile and social media tools in journalism, and

- real-time curation of student blogs.

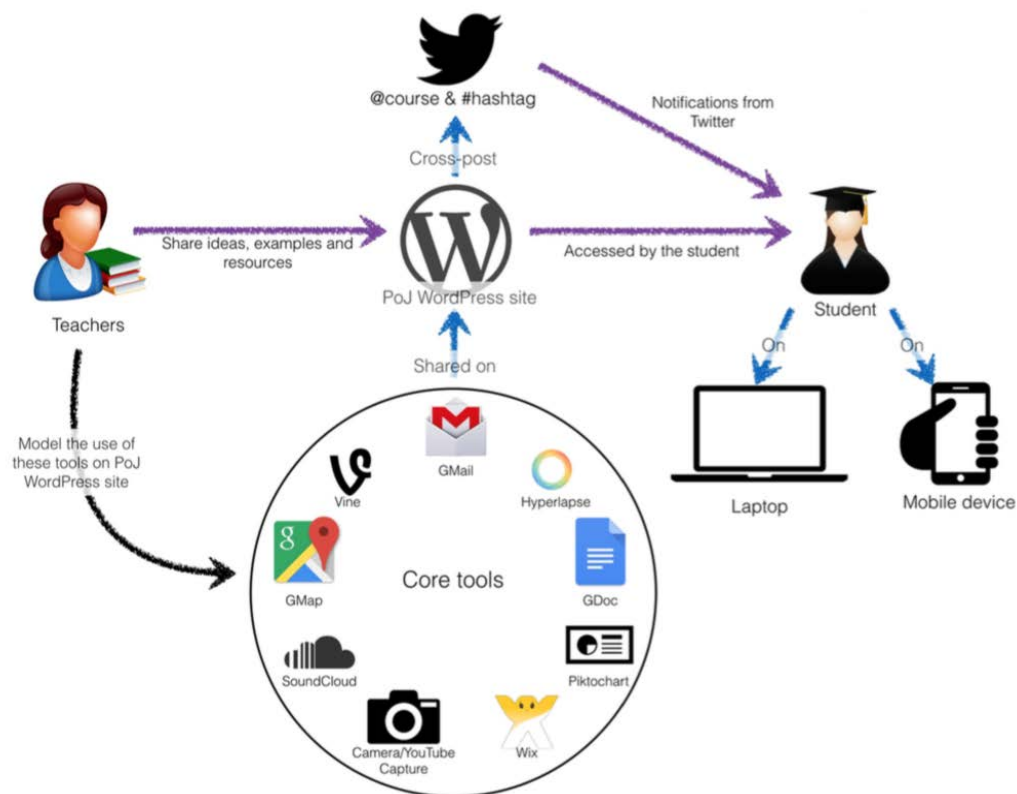


Figure 3. EoR setup for the second iteration

The revised solution was implemented in the following year with a new cohort of students, and data were collected. Data from both iterations were analysed to evaluate and refine the design principles.

Reflection and refinement of the design principles

In the last phase of the study (phase 4), the findings from each iteration and changes made to the learning environment between iteration allowed the researcher to reflect on the entire process to create a refined set of design principle as contribution to theory and practice. The following section discusses the findings related to each draft design principle (DPs 1-6 in Table 2), informing researcher reflections to refine the design principles. Verbatim quotations are provided to ensure participant voices are accurately presented and pseudonyms are used to protect their identity.

DPI: 3Ps of Pedagogy 2.0

Designing for participation as part of the first design principle provided the students with several learning benefits in both iterations. Student tweet shared using the class hashtag were collected and analysed using Tags (Hawkey, 2015). An overview of the findings is provided in Table 3. The Twitter analysis along with student data from their blog, interview, and focus group highlighted that the participation element enabled the formation of an organic learning community on Twitter, sharing of resources, collaboration between students, with experts, and other people beyond the bounds of the classroom and the country. According to the students, it also increased the degree of interconnectedness between them and the teacher:

That was my bridge between myself and then with everyone else, it was not only my community, but with Twitter, that was my bridge between my teachers and then my bridge between other students. (Addison, interview)

Table 3
Class hashtag analysis

	Total number of tweets sent	Number of external collaborators	Collaborators from other countries	Number of student created hashtags
Iteration 1	997	368	England, Ireland, the Netherlands, Egypt, Canada, Australia, Philippines, China and Japan	161
Iteration 2	1374	397	India, Australia, USA, England and Ireland	182

The analysis of the data also showed that the design for participation also enabled true-collaboration between the students and the teachers, allowing the learner to seek guidance when needed while allowing the teacher to provide feedback when required:

It's been good to be able to interact with the tutors on Twitter and on the blogs. To be able to keep up with them, so if you've got a question at any time during the week, you can easily ask them. (Jaha, focus group)

Student participation also increased the visibility of their work, which triggered higher cognitive processes. The opportunity to explore the learning task from multiple perspectives and the ability to compare and contrast the content and learning shared by the peers allowed students to construct their own understanding and acquire new knowledge:

Looking at other people's stuff, you push to have something that's unique. You want something that's different to everyone else ... I want to do this not always better but in a different perhaps another way. (Fin, focus group)

The mobile and social media affordances embedded in designing for participation allowed the students to create and share authentic content, providing real audience who could read and comment on student work. The affordances also provided the students with the opportunity to enact authentic journalistic practices in real world contexts, helping them become journalists:

I don't see the point of referring to myself as a student if what I want to be is a journalist. I think that's actually going to hinder more than help me when I'm trying to get out there. (Teresa, interview)

The ability to participate with the teacher, peers, experts, and people around the world, and to collaboratively create authentic content provided the students with learning opportunities and scaffolding to transition from knowing to being: from knowledge, to learning to become a journalist. Student data were also analysed to evaluate and understand the impact of the personalisation element of the first design principle. A core tenet in designing for personalisation in the course was enabling learner autonomy in the

learning process. In both iterations, the learners were provided with a learning task, to create a multimedia news story based on a person, place or an issue. The learners were then provided with support and scaffolding for the duration of the course for composing a trustworthy news story. Increased learner autonomy in the course was the key element for enabling self-directedness. Autonomy provided the students with choice, inspiration, passion, and motivation:

I found that it was probably the most exciting [course] and the most inspiring. I always feel motivated to do my work in this [course] compared to other ones. (Riley, interview)

According to the students, autonomy also positioned them as the main agent in the process, providing them ability to direct and determine their learning path and process:

The subject choice was my own and that the way I went about researching and basically everything to do with my individual story that was definitely all my own self-directing, even down to how you use the blog, producing the blog, talk to people on social media - that was all self-directed. (Maya, interview)

The students felt that because they were directing and determining their own learning it provided them with the opportunity to learn from experience (experiential learning) and helped them identify their strengths and weaknesses: “You can assess yourself in what you know and what you don't know, and then learn for yourself rather than being taught what you know” (Emori, interview). The use of mobile and social media tools also played a critical role in personalising the learning experience. The mobile and social media tools empowered the students. It helped them seek support and scaffold in and across communities and also enabled them to create communities for learning, and eliciting feedback and information for the news story:

Social media helped me build my story a lot more. If I didn't have social media, I don't think it would have been as authentic and genuine ... that's how I talk to a lot of the neighbors ... it helped it spread and to get a more accurate idea of the story. (Skylar, interview)

Along with the design of the learning tasks and strategic use of several social media tools, students were also required to keep a reflective blog as part of ongoing formative assessment in the course. According to the students blogging provided them with openness, ownership, ability to express passion and capture content, and provided space for the students to set goals and milestones (to be self-regulated):

I was able to set milestones for myself and grow past them. If they hadn't have been there, I don't think I would have got as far as I did. It gave me something to go, this is what I need to get done this week. I was able to organise myself better. (Mateo, interview)

Blogging also provided the students with time and format for continuous reflection and continuity of thinking, helping identify strengths and weaknesses for creating new knowledge: “I found the blog very helpful in highlighting weak spots within my story and making me aware of exactly what I was missing and where I needed to go next.” (Lucy, blog)

The central role of the learner in the course created opportunities to learn lifelong learning skills, such as effective communication skills and increased awareness of other learning opportunities in their surroundings, providing a framework for ideation and skills to be self-directed. The mobile and social media affordances provided the students with the ability to apply these skills and knowledge in different learning contexts, helping build new and transferable knowledge, and skills. For example, Clara applied the skills she had learnt in the course to cover a fashion show she was involved in by providing a live commentary using Twitter:



Figure 4. Cross-application of skills (Clara, tweet)

The personalisation element in the design enabled learner autonomy, empowering them to be self-driven and directed, enabling transfer and application of skills and knowledge in new contexts, which helped build lifelong learning skills and capability. In the third design element of the first design principle, productivity, the students were capable of creating content by collating resources and information from the web, by interacting with people, and capturing data and information using the affordances of mobile and social media tool in contexts, resulting in learner-generated content and contexts. As part of the design, students shared the content created on their portfolio (blog), which was analysed, and an overview is provided in Table 4.

Table 4

Content from the volunteering group

	Total # of blog posts	Average # of posts	More than 300 words (blog requirement)	More than 3 multimedia content (course requirement)
Iteration 1 (n = 28)	527	19	>92%	>86%
Iteration 2 (n = 29)	464	16	>95%	>97%

The ability to create content using the mobile and social media affordances provided the students with creative freedom allowing them to express their passion, making the learning interesting and purposeful:

It kind of turns the passion into actual content so you can create it rather than just thinking about it, I mean like, “Oh that was really interesting, I really enjoyed it.” You can make it.
(Bellamy, focus group)

Learner-generated content in the study also helped the students with reflection. It aided the reflection process by triggering memory and details of the event that was captured. The content also provided the students with an alternative perspective that improved their clarity and understanding making the learning memorable: “I knew I could go back because you have the Tweets, you don’t only have what people said, you have the memories attached to what was happening” (Wells, focus group).

The mobility of the device and connectivity enabled the students to create content in real world contexts as part of daily life helping them embody learning and journalistic practice. The students commented that the embodiment of practice and the ability to create content immersed them in the context for the story and helped them elicit meaningful data and information as part of the process. The students during this process were also able to identify gaps in their story and collect further data and information to improve it:

It helped me break down the story myself into different parts, and understand it better ... I had to condense it. I had to make sure I understood why I was condensing. I had to reread my story just to make sure I was making sense, and I realized something about the story that I didn’t see before. (Audree, interview)

The productivity element of the design enabled the students to become creators of content, which encouraged reflection and allowed them to embed learning and journalistic practice in everyday contexts.

As identified in literature review, there is a lack of understanding on heutagogical use of mobile and social media tools and affordances for learning (Blaschke, 2012). The 3Ps helped operationalise the central tenet of heutagogy, learner autonomy, by guiding the design of the course and the use of mobile and social media affordances. It empowered learners to be self-directed and determined in their learning and as a result was retained in its original form.

DP2: Designing for learning with open, platform independent and learner-owned devices

The use of learner-owned devices, open and platform independent social media tools in the course provided the students with a number of learning benefits. The constant connectivity and pervasiveness of the device and social media tools meant that the students had enhanced access to information and resources on the web:

It means immediate connectivity. At all times I can look up or tweet or speak to somebody.
There's no limit on the physical world any more as a result of that. (Lincoln, focus group)

At the same time, it provided access to people and the ability to initiate a conversation with them when needed: "It opened the way for me to network with other engaged citizens and Journalists alike" (Leo, blog). It also allowed the students to manage their learning and tasks using scheduling applications on their device.

The smart-devices allowed the learner quick access to social media applications when and where needed, acting as a mobile creation studio. The learners were able to capitalise on the openness of the social media tools to freely access resources on these platforms and to seek and collaborate with people and experts to learn with and from:

It makes you more versatile. I can work across - I can work out in the open, talking to people;
but then you can also meet the people that go online, and do all the creating, and stuff like
that. (Wells, focus group)

The mobility of the device and the platform independent and open social media tools provided the learner with mobility for embedded learning. These affordances allowed learners the freedom and the ability to weave the technological, conceptual, social and time contexts as part of their learning, helping embody learning and practice as part of daily life: "Technology's really important because it is everywhere, and so are we, we are everywhere because social media's everywhere" (Clarke, focus group). This design principle was also a conduit for embedding effective use of bring-your-own-device (BYOD) in the study that provided a sustainable, equitable and inclusive learning experience for all students (Traxler, 2016). As a result, it was retained in its original form.

DP3: Learning in learner-determined contexts

On the formal and informal continuum for learning, the findings suggest that this design principle played an important role in facilitating learning in informal contexts; everyday social and cultural contexts reflecting the environment the students lived in. Due to the unfamiliar learning environment and socially and culturally sensitive surroundings, the students felt that they needed to move out of their comfort zone to learn. The learning tasks and activities, and mobile and social media affordances helped the students transition to the zone of learning; building passion and confidence. Nia commented on the impact learning in authentic contexts had on her learning experience in the course:

It's given me probably a bit more; it's putting you outside your comfort zone. You're not going
to learn unless you're put outside your comfort zone, you're not going to grow. (Nia,
interview)

The informal contexts offered the students opportunities for serendipitous learning and to act and enact journalistic practices through experimentation and exploration: "I've just been trying different things and seeing what works the best" (Maya, interview), helping build new knowledge and capability. The rich social and cultural contexts engaged the learners in conversations and interactions that offered opportunities for them to gain an insight into their own capabilities, provided motivation, and informed their ethical and

human values, and helped them grow as individuals: “In 12 weeks of doing Principles of Journalism I have learnt a lot about myself and what motivates me to work hard” (Skylar, blog).

An important learning outcome in heutagogic learning is that the learner develops capability (Blaschke & Hase, 2016). This design principle played an important role in helping the learner build capability, as it provided them with mobility and the opportunity to apply their knowledge and skills in new and unfamiliar contexts. As a result, it was retained in its original form.

DP4: Designing formative learner assessments

This design principle enabled learner autonomy in the assessment process. This provided the students with ownership, motivation, and passion that helped engage them in the learning process, made them self-analytical, and create authentic content that had relevance. For instance, Riley commented on the impact having ownership and ability to customise elements of the assessment had in her learning:

I find that if you tell me exactly what I need to do, I won't put much thought into it. But because it was more self-led, we did a lot more self-analysis. (Riley, interview)

The learners worked in real world contexts to create their news story, providing a backdrop for the learners to learn from experience. These contexts offered students multiple opportunities to “criss-cross” (Herrington & Oliver, 1995, p. 27) the learning environment helping them reflect, build an understanding, and provided opportunities to elicit data and information. The extract below outlines how working in authentic context and engaging with entities helped a student evaluate and inform her news story, and provided opportunities for eliciting further information and data:

I just talked to everyone and that's kind of how I got different angles on my story because some people said, “The market's moving.” So I was like, “I'll check that out.” Or you talk to people and it's another thing that you go and learn about (Emori, interview)

While the participation element of the first design principle allowed the students opportunity for learning to become, the findings suggest that the assessment, in particular the assessment tasks also played a critical role in enabling the transformation:

The work that we create has resonance. It's set in a real world environment. And that's teaching you life skills that you don't get in an academic context. (Bellamy, focus group)

The findings suggest that the assessment tasks needed to align with the learning activities, which in this study were the sub-tasks the students derived from the broad outline they were given to create a news story. This enabled the assessment tasks and learning activities to be seamlessly integrated in the learning process and provided students autonomy. In this process, the teachers were observed to have also played an important role in supporting and scaffolding the learner. According to student comments the teachers played a dynamic and versatile role in the course, which helped them understand, drive their learning, gain the skills and knowledge needed for working in socially and culturally rich contexts, and achieve the conceptual changes needed to complete the learning tasks. For example, Anya alluded to lecturers collaborating with her at a metacognitive level to inform her learning in the course:

They helped me in a way that it got me to a new place with my story and allowed me to process further, but didn't give me every single detail. That's honestly the best way to describe them, as guidance. Guardian angels in a sense. (Anya, focus group)

Along with the 3Ps (DP1), this design principle also played an important role in helping students learn to become. The 3Ps provided the students with the impetus to engage in activities that promoted and informed the process for learning to become. This design principle provided a framework that enabled authentic collaboration between the teacher and the learner for completing the learning tasks and activities and, in helping the learner build tacit knowledge and skills in authentic contexts, creating opportunities for learning to become. The process places a focus on aligning learning outcomes with activities, tasks and assessment; constructive alignment (Biggs & Tang, 2011). This design principle, as a result was modified from the original to focus on enabling the process of learning to become, which also helps achieve constructive alignment in the design of the course. The design principle was revised to design formative assessment events that encourage learner participation and reflection in authentic contexts to inform the process of

learning to be.

DP5: Providing a rationale and an explanation for the use of the tools in learning

This design principle attempted to help students understand and conceptualise the use and affordances of mobile and social media tools for learning. On its own, this design principle was insufficient to guide the design of the kinds of support and scaffolding required by the students. Complications arose in practice in the first iteration, as students expressed that they needed more awareness and clarity on how and when to apply the tools and the affordances in learning contexts, identified as an area for improvement in the second iteration (discussed early in the section).

The EoR implemented in the second iteration was observed to have played a critical role and provided the students with a platform for sustained engagement with peers and teachers to conceptualise and understand their role in the learning process, improving the use of mobile and social media affordances in the course. The students in both iterations were asked in the voluntary online survey to rate what they felt about the statement: “The use of mobile and social media tools in PoJ allowed me to pick an environment that I thought was most meaningful to my learning and enabled me to explore my understanding of the topic and build on it” (Q13), using a Likert scale (from 1 *strongly agree* to 5 *strongly disagree*) outlined in Figure 5. In comparison to the number who either *strongly agreed* or *agreed* in the first iteration (42%), a greater number of students in the second iteration (64%) indicated that the affordances of mobile and social media tools were useful while working in a meaningful context for learning. Similarly, increased student participation in the Twitter community (Table 3) was observed. The students also collaborated with greater number of people (Table 3) and generated more Twitter hashtags (Table 3) and multimedia content (Table 4).

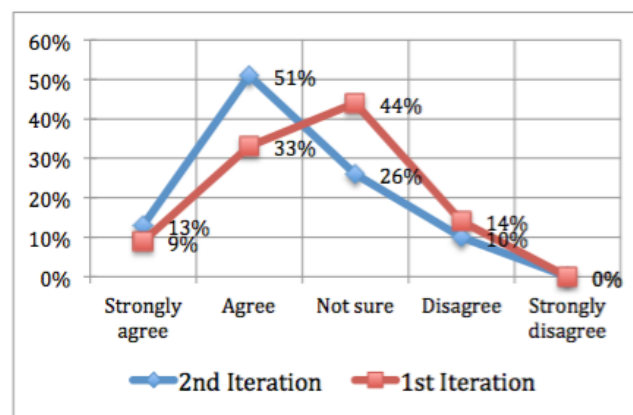


Figure 5. Use of mobile and social media tools in authentic contexts

The EoR implicitly embedded this design principle as a continuous and embodied process in the course, providing opportunity for students and teachers to collaborate and engage in an on-going conversation or when required to clarify and understand the learning expectation, use of the tools and create knowledge. The EoR, however, also formed an important element of the DP6, which combined allowed teachers to explain and discuss learning expectations in conjunction with technological support and pedagogical affordances of the tools integrated in the course.

DP6 and EoR provided an effective approach for instigating and cultivating conceptual change in the learner, making this design principle redundant, and as a result was deleted as a principle in its own right.

DP6: Technological support and pedagogical modelling

Along with the need for the students to understand and conceptualise the use of the tools for learning, the findings in the study also suggest that technological help and support was equally critical to help build digital skills and knowledge:

It was quite scary at first, purely because I didn't know how to work that thing [Twitter]. It was the most complicated thing, and I felt really in the dark about it and like even watching the tutorials. (Octavia, focus group)

Similarly, the modelling of the tools and their affordances played an important role for the students to understand their use in academic contexts. The tools and their affordances were predominantly integrated in the teaching practice to model effective use in journalism. The findings suggest that this helped change student learning behaviour and expectations, and helped them conceptualise the use of the tools in learning:

Never in my wildest dreams would I have thought that I would be facebooking, tweeting and blogging about an issue for a university assignment, as I always viewed them as tools for social enjoyment, something completely separate from an academic tool for learning.
(Kersey, blog)

As with DP5, the EoR played a core role in enabling an effective platform to provide easy access to technological help and resources, and for the practitioners to collaborate and model the use of the tools on an ongoing basis. Two critical elements were identified in the study for effectively implementing this design principle:

1. Ensuring that students have access to information and resources that will help them understand the course requirements and expectations, and learn how to use the tools, as part of the EoR, and
2. The teachers create and nurture a learner community, collaborate with students, create, curate, and share examples of effective use of mobile and social media affordances, helping establish an EoR.

This design principle helped bridge learner digital literacy skills that moved beyond the learner's ability to use the tools, and access and evaluate information to building a cultural understanding (Buckingham, 2010) of how to use mobile and social media tools for learning in authentic contexts created as part of everyday life. As a result, this design principle was retained in its original form.

Conclusion

This paper described the use of design principles to guide the design, implementation, evaluation and analysis of a journalism course. Of the original six design principles (Table 2) that guided the design of the learning solution. Four design principles were retained in their original form, one was revised, and one was deleted. These revisions occurred after the course was implemented and evaluated, and they were based on analysis of data collected from the study participants including interview responses, focus groups, social media comments, and the artefacts they created.

The design principles formulated, evaluated, and refined as part of the study helped reify the core tenets of heutagogy by effectively exploiting the affordances of mobile and social media tools for active learner participation in the learning process, enabling creation of content, and learning in or by creating authentic contexts. The design principles helped with strategically selecting tools appropriate for the context and for designing for learning (Beetham & Sharpe, 2013), capitalising on their affordances driven by sound pedagogy.

The five refined design principles derived from the study for heutagogic learning using mobile and social media tools are as follows:

1. Design learning activities, tasks and a learning environment that encourage elements of learner participation, personalisation and productivity underpinned by the affordances of mobile and social media tools.
2. Facilitate learning using tools that are open, platform independent and learner-owned.
3. Situate learning in authentic contexts chosen by the learner to enable exploration and experimentation.
4. Design formative assessment events that encourage learner participation and reflection in authentic contexts to inform the process of learning to be.
5. Provide technological support and pedagogical modelling of the use of the mobile and social media tools.

A core-construct and critical element underpinning effective implementation of the design principles is the creation of an ecology of resources. The EoR provides the students and teachers a collaborative space to engage in sustained conversation that helps the students understand and conceptualise their role in the

course. The EoR also provides the teachers space to model pedagogical use of the tools and affordance for learning purposes and create and share resources that help the students build their digital capability.

While DBR adds to both theory and practice, this paper specifically focused on providing the refined design principles elicited from the 2 year study that has the potential to influence practice. It is hoped that the design principles here are able to guide other practitioners who are in turn able to build on it and share their own experiences and knowledge, further enhancing and informing the use of heutagogy and mobile and social media tools in learning and teaching.

Further research

Further research aimed at understanding the transferability and effectiveness of the design principles derived in this study in different contexts and how it may inform the development and creation of a curriculum is in process in collaboration with nursing, physiotherapy and business practitioners.

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